

EXHIBIT "A"  
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KNIGHT'S  
AMERICAN  
MECHANICAL DICTIONARY.

A DESCRIPTION OF TOOLS, INSTRUMENTS, MACHINES, PROCESSES,  
AND ENGINEERING; HISTORY OF INVENTIONS;  
GENERAL TECHNOLOGICAL VOCABULARY;

AND

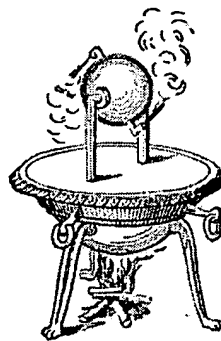
*DIGEST OF MECHANICAL APPLIANCES IN SCIENCE AND THE ARTS.*

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CIVIL AND MECHANICAL ENGINEER, ETC.

**Illustrated**  
WITH UPWARDS OF SEVEN THOUSAND ENGRAVINGS.

VOLUME I. — A-GAS.

"Thus Time brings all things, one by one, to sight,  
And Skill evolves them into perfect light." — LUCRETIVS, Book V.



First Steam Engine.

BOSTON:  
HOUGHTON, MIFFLIN AND COMPANY.  
*The Riverside Press, Cambridge.*  
1881.

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supposition probable. The crook was not held in as much honor as the sickle, nor the tender of animals as the cultivator of the land. A weapon like a flail was used in war, but Osiris was eminently peaceful and useful, and his emblems had the same character.

The flail is the ordinary means of thrashing in Japan. It differs in no essential respect from that of other countries. The illustration, from a native painting, shows that both sexes engage in the work.

2. An ancient weapon used in war. It was a club swinging from the end of a long handle, like the *morning-stars* of the London train-bands, three centuries since.

A war-club studded with *iron* spikes and mounted like a flail was found at Sakkarah, and is in the Abbott Museum of Egyptian Antiquities in New York.

**Flake.** 1. A platform of slats, wands, or hurdles, on which fish or fruit is placed to dry. A *fish-flake*.

2. A stage suspended over the side of a ship for the convenience of the painters or calkers.

**Flame-bridge.** A wall rising from the floor of a furnace to cause the flame to impinge upon the bottom of the boiler.

**Flame-engine.** An early name for the gas-engine, in which the piston is moved by the expansion due to the sudden combustion of a body of gas in the cylinder. See *GAS-ENGINE*.

**Flang.** A two-pointed miner's pick.

**Flange.** (*Machinery.*) A projecting rib or rim for strength, as a guide, or for attachment to another object.

1. A strengthening rib, as in the flange of a fish-bellied rail, or girder.

2. A guide-flange, as in the rib of a car-wheel projecting beyond the tread.

3. A fastening flange, as on the end of pipe, steam-cylinder, etc.

**Flange-joint.** A joint—such as that of pipes—where the connecting pieces have perforated flanges by which the parts are bolted together.

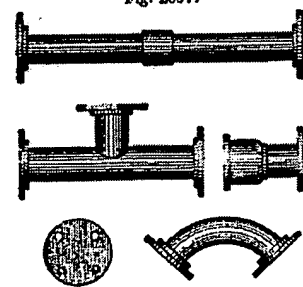
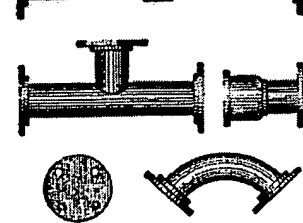


Fig. 2007.

**Flange-rail.** A rail having a bent-up flange to keep the wheel on the track.



**Flanging-machine.** (*Sheet-metal.*) A machine usually having two rollers so constructed and arranged as to bend over the

Flanged Sections.

edge of a piece of tin-plate which is passed between them. The modes of bending are known as *bend-ing*, *burring*, *seaming*, *flanging*, etc.

In the example, the outer circumferential corner of the lower disk is turned out rectangularly, and the other disk has a peripheral flange, which enters the groove and forms an out-turned flange around the edge of the cylinder. See *DOUBLE-SEAMING MACHINE*.

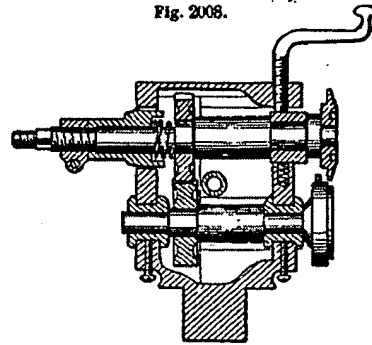
**Flank.** 1. (*Gearing.*) The acting surface of a cog, *within* the pitch-line. The outer portion is the *face*.

2. (*Architecture.*) The *haunch* of an arch; the shoulder between the *crown* and the *springing*.

3. The thin portion of a skin of leather; that which previously covered the flank of the animal.

4. (*Fortification.*) That portion of a bastion

Fig. 2008.



Flanging-Machine.

which reaches from the *face* to the *curtain*. The *flank* of one *bastion* commands the *ditch* before the *curtain* and the *face* of the opposite *bastion*. See *BASTION*.

5. The return side of any body, as of a house, a wall, an ashlar in position, etc.

**Flan'nel.** (*Fabric.*) A soft, open woolen stuff, of which there are many kinds, twilled or plain and undressed, milled, gauze, colored, and checked. Also made for specific purposes, as house, horse, printer's blankets.

**Flan'ning.** (*Building.*) The internal flare of a window jamb. The *embrasure*.

Or of a fireplace. *Coving*.

**Flap.** A hinged leaf of a table or shutter.

An inside shutter has several pieces, the principal one of which is the *front shutter*; the one which folds into and is concealed in the *boxing* is the *back-flap*.

**Flap-tile.** A tile with a bent-up portion to turn a corner or catch a drip.

**Flap-valve.** A valve which opens and shuts upon one hinged side. A *clack-valve*.

The common pump-valve consists of a disk of leather opening upward when the pump-rod descends, and has a leaden or brass weight attached to it.

**Flar'ing.** Overhanging, as of the bows of a ship, the top side forward.

Increasing in diameter upward, as of an upwardly expanding pan. *Funnel-shaped*, *conical*, *trumpet-mouthed*.

**Flash'er.** (*Steam.*) A form of steam-boiler in which small bodies of water are injected into a heated boiler and flashed into steam, sufficient being injected at each time for one stroke. See *INSTANTANEOUS-GENERATOR*.

**Flash'ing.** 1. (*Hydraulic Engineering.*) Concentrating a fall of water at one point, so as to increase the depth to allow the passage of a boat from one level to another, as at *a*. The river having a dam across it and a sluice at one point, the sluice-gate is opened, and during the temporary increase of depth in the sluice-way the boat is drawn through.

It is a very ancient device (see *SLUICE*), and is still used in many countries with boats of moderate size.

A memorable case of flashing is that when Lieutenant-Colonel Bailey rescued the fleet of gunboats on Red River after the defeat of the Union army under General Banks. The gunboats were *flashed* over the falls at Alexandria by means of a wing-dam made of log cribs filled in with stone.

2. (*Plumbing.*) *a*. A lap-joint *b*) used in sheet-metal roofing, where the edges of the sheets meet on a projecting ridge.